

Appendix K

Wildlife

In the following appendix, DNR provides additional information regarding the analysis of the No Action and Landscape alternatives. For the Pathways Alternative, refer to the FEIS.

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Endemic and Sensitive Species

Geographic isolation and the characteristics of the Olympic Peninsula have led to the evolution of endemic species and subspecies, shown in Table K-1. Endemic species are those species that are native and exclusive to a particular area. Of the wildlife listed in Table K-1, only the Olympic ermine and Olympic torrent salamander are known to occur on DNR-managed lands in the OESF.

Table K-1. Wildlife Species and Subspecies Endemic to the Olympic Peninsula

Olympic Peninsula endemic species	
Common name	Scientific name
Olympic marmot	<i>Marmota olympus</i>
Olympic yellow-pine chipmunk	<i>Tamias amoenus caurinus</i>
Olympic snow mole	<i>Scapanus townsendii olympicus</i>
Olympic Mazama pocket gopher	<i>Thomomys mazama melanops</i>
Olympic ermine	<i>Mustela erminea olympica</i>
Olympic torrent salamander	<i>Rhyacotriton olympicus</i>

Table K-2. Sensitive Wildlife Species Known or Suspected to Occur on DNR-Managed Lands in the OESF

Species and status ^a	Habitat			Status in the OESF ^b
	Foraging	Breeding and/or resting	General upland	
Red-legged frog (FCo)	Ecosystem Initiation and Structurally Complex stand development stages	Requires riparian for breeding.	Moist habitats, including shrubby areas with large woody debris.	Widespread, common
Western toad (FCo, SC)	All	Requires riparian for breeding	Large woody debris	Locally common
Northern goshawk (FCo, SC)	Edges and open forest, Structurally Complex	Structurally Complex	Mature and late-successional forests	Local, rare
Bald eagle (SS, FCo)	Large trees and snags near water	All stages, but requires large trees for nesting and protected stands for roosting	Large trees for nesting, dense and mature forest stands for winter roosts	Widespread, common
Great blue heron (SM)	May forage in Ecosystem Initiation stands	Biomass Accumulation, Structurally Complex, (generally near large water bodies)	Mature forest stands (nesting)	Widespread in appropriate habitat, uncommon
Olive-sided flycatcher (FCo)	Ecosystem Initiation	Structurally Complex	Large trees adjacent to open areas	Widespread, uncommon
Osprey (SM)	Water (non-forest)	Structurally Complex	Large trees for nesting, perching, roosting near large bodies of water	Distribution and abundance declining with increase in bald eagles
Turkey vulture (SM)	May forage in Ecosystem Initiation stands	Structurally Complex	Mature tree stands for roosting	Increasing as a breeding season resident
Vaux's swift (FCo, SS)	Aerial foraging over all stages	Structurally Complex	Large snags for nesting	Widespread, common near nesting habitat (including residential chimneys)
Willow flycatcher (FCo)	Ecosystem Initiation	Ecosystem Initiation	Shrubby habitats	Widespread, common in appropriate

Species and status ^a	Habitat			Status in the OESF ^b
	Foraging	Breeding and/or resting	General upland	
				habitat
Long-eared myotis (FCo, SM)	Ecosystem Initiation	Structurally Complex	Large snags and trees for roosting	Distribution and abundance of individual <i>Myotis</i> species unknown
Long-legged myotis (FCo, SM)	Ecosystem Initiation	Structurally Complex	Large trees and snags for roosting	Unknown
Yuma myotis (FCo)	Ecosystem Initiation	Structurally Complex	Large trees and snags for roosting	Unknown

^a Source: Brown1985; Johnson and O'Neil 2001

^b FCo = Federal Species of Concern, SC = State Candidate, SE = State Endangered, SS = State Sensitive, ST = State Threatened, SM = State Monitor

Common and Scientific Names

Table K-3. Common and Scientific Names of Species in the Wildlife Section of Chapter 3, in Alphabetical Order

Common name	Scientific name
American marten	<i>Martes americana</i>
American robin	<i>Turdus migratorius</i>
Bats	order Chiroptera
Big brown bat	<i>Eptesicus fuscus</i>
Black bear	<i>Ursus americanus</i>
Black throated gray warbler	<i>Dendroica nigrescens</i>
Blue grouse	<i>Dendragapus obscurus</i>
Bobcat	<i>Lynx rufus</i>
Brown creeper	<i>Certhia Americana</i>
Brown-headed cowbird	<i>Molothrus ater</i>
California myotis	<i>Myotis californicus</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Chestnut-backed chickadee	<i>Poecile rufescens</i>
Columbia black-tailed deer	<i>Odocoileus hemionus columbianus</i>
Common raven	<i>Corvus corax</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Corvids	<i>Corvidae</i> species
Cougar	<i>Felis concolor</i>
Creeping vole	<i>Microtus oregoni</i>
Dark eyed junco	<i>Junco hyemalis</i>
Deer Mouse	<i>Peromyscus maniculatus</i>
Douglas squirrel	<i>Tamiasciurus douglasii</i>
Ensatina	<i>Ensatina eschscholtzii</i>
Fisher	<i>Martes pennanti pacifica</i>

Common name	Scientific name
Fox sparrow	<i>Passerella iliaca</i>
Golden crowned kinglet	<i>Regulus satrapa</i>
Gray wolf	<i>Canis lupis</i>
Great horned owl	<i>Bubo virginianus</i>
Grizzly bear	<i>Ursus arctos</i>
Hairy woodpecker	<i>Picoides villosus</i>
Hoary bat	<i>Lasiurus cinereus</i>
Keen's myotis	<i>Myotis keenii</i>
Little brown myotis	<i>Myotis lucifugus</i>
Long-tailed weasel	<i>Mustela frenata</i>
Marbled murrelet	<i>Brachyramphus marmoratus</i>
Moles	<i>Scapanus species</i>
Mountain beaver	<i>Aplodontia rufa</i>
Northern alligator lizard	<i>Elgaria coerulea</i>
Northern flying squirrel	<i>Glaucomys sabrinus</i>
Northern goshawk	<i>Accipiter gentilis</i>
Northern pygmy owl	<i>Glaucidium gnoma</i>
Northern saw whet owl	<i>Aegolius acadicus</i>
Northern spotted owl	<i>Strix occidentalis caurina</i>
Northwestern salamander	<i>Ambystoma gracile</i>
Olive sided flycatcher	<i>Contopus cooperi</i>
Orange-crowned warbler	<i>Vermivora celata</i>
Pacific tree frog	<i>Hyla regilla</i>
Pacific wren	<i>Troglodytes pacificus</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine siskin	<i>Carduelis pinus</i>
Porcupine	<i>Erethizon dorsatum</i>
Red backed vole	<i>Myodes californicus</i>
Red breasted nuthatch	<i>Sitta Canadensis</i>
Red cross bill	<i>Loxia curvirostra</i>
Red tailed hawk	<i>Buteo jamaicensis</i>
Roosevelt mountain elk	<i>Cervus canadensis roosevelti</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Rufus-sided (spotted) towhee	<i>Pipilo erythrophthalmus</i>
Sharp skinned hawk	<i>Accipiter striatus</i>
Short tailed weasel	<i>Mustela frenata</i>
Shrew mole	<i>Neurotrichus gibbsii</i>
Shrews	<i>Sorex species</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Snowshoe hare	<i>Lepus americanus</i>
Song sparrow	<i>Melospiza melodia</i>
Spotted skunk	<i>Spilogale gracilis</i>
Steller's jay	<i>Cyanocitta stelleri</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Townsend's chipmunk	<i>Tamias townsendii</i>
Townsend's warbler	<i>Dendroica townsendi</i>
Tree swallow	<i>Tachycineta bicolor</i>
Trowbridge's shrew	<i>Sorex trowbridgii</i>
Vagrant shrew	<i>Sorex vagrans</i>

Common name	Scientific name
Vaux's swift	<i>Chaetura vauxi</i>
Violet green swallow	<i>Tachycineta thalassina</i>
Warbling vireo	<i>Vireo gilvus</i>
Western screech owl	<i>Otus kennicottii</i>
Western tanager	<i>Piranga ludoviciana</i>
Western toad	<i>Bufo boreas</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>

Interior Older Forest

■ Methodology for Assessing Interior Older Forest

For this assessment, DNR did a coarse filter analysis of interior older forest (Biomass Accumulation and Structurally Complex stand development stages). These stages were evaluated because they are generally associated with more rare, vulnerable, and threatened species in the Pacific Northwest.

DNR used modeling output from the analysis model for stand development stages. Biomass Accumulation and Structurally Complex polygons from the analysis model were dissolved through a GIS process into patches. These patches are referred to as older forest patches.

To assess older forest patches, assumptions were made on what constitutes a high-contrast edge. For this analysis, high-contrast edges are where older forest patches border a patch with a lack of forest cover. Conditions with lack of forest cover (for this analysis) are paved roads, large water bodies, human made clearing such as rock pits, and forest stands in Ecosystem Initiation stand development stage. Streams, unpaved roads, and forest stands in stages other than Ecosystem Initiation stages are not assumed to be high-contrast edges. Both streams and unpaved roads have varying degrees of forest cover associated with them. Some streams and unpaved roads have trees on either side growing over them, providing some canopy. DNR did not have a way, for this coarse filter analysis, to determine which streams and unpaved roads lacked forest cover wide enough to be considered a high-contrast edge. Instead these features are considered soft edges and are outside the scope of this analysis.

In GIS, paved roads, large water bodies, human made clearing such as rock pits, and forest stands in Ecosystem Initiation stand development stage were put into a single category. This category was called Ecosystem Initiation polygons. Then through GIS, these Ecosystem Initiation polygons were buffered 100 meters. One hundred meters was chosen because it has been used by DNR in other analyses for the effects of edge.

The Ecosystem Initiation polygons, including 100-meter buffers, were then overlaid in GIS on the other stand development stages. When 100-meter buffers of Ecosystem Initiation Polygons overlapped older forest patches, the overlap sections were removed from the older forest patches, leaving patches of interior older forest. For an interior older forest patch to be considered adequate to support wildlife

species associated with habitat conditions present, a 100-acre threshold was used. All reporting for this analysis is for interior forest patches of 100 acres and larger.

Table K-4. Assumptions for Interior Older Forest Analysis

Assumption	Rationale
Interior older forest patches need to be 100 acres or larger.	Patches smaller than that do not meet the needs species requiring older stand conditions.
A high-contrast edge is when the Ecosystem Initiation Stand is within 100 meters of stands in the Biomass Accumulation and Structurally Complex Forest stand development stages.	This is a drastic edge where other stand development stages are forest abutting forest.
Unpaved forest roads and streams are not high-contrast edges.	Roads and streams such as these often have canopy cover partially covering the road or stream and are not of a great enough width to cause edge effects at the scale of this analysis.
Patches with less edge-to-area are more desirable to wildlife associated with older forest conditions.	More interior conditions will be present.

■ Interior Older Forest Metrics

Three metrics were used in the FEIS to evaluate trends that can give insight into the development of interior older forests. Edge-to-area ratio is used to compare the amount of edge to the amount of areas within the patch (Figure K-1, Table K-5). It is a relative number; looking at the trend is more important than the values given. In general, as edge-to-area ratios increase, so does the complexity of the shape of the patch. In other words, patches are less uniform in shape; often, they are more linear or complex.

Figure K-1. Examples of Edge-to-Area Ratio



The second metric is the number of acres of interior older forest patches that are 100 acres or greater (Table K-5). This shows the trend of development of interior older forest conditions over the analysis period.

The third metric is the average size of patches of forest 100 acres and greater. This metric indicates if, over time, the size of interior forest patches stays relatively the same, increases, or decreases.

Table K-5. Interior Older Forest Metrics

Metric	Description	Scale
Edge-to-area ratio	This compares the amount of edge to the amount of area. It is a relative metric and is used to track how forest patches change over time.	State trust lands in the OESF, each of the 11 landscapes
Number of acres	Tracks the number of acres of 100-acre and greater patches.	State trust lands in the OESF, each of the 11 landscapes
Average size of patches	Tracks the average sizes of patches 100 acres and greater.	State trust lands in the OESF, each of the 11 landscapes

Interior Older Forest Metrics, All State Trust Lands in the OESF

Chart K-1. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres and Greater on State Trust Lands in the OESF, No Action and Landscape Alternatives

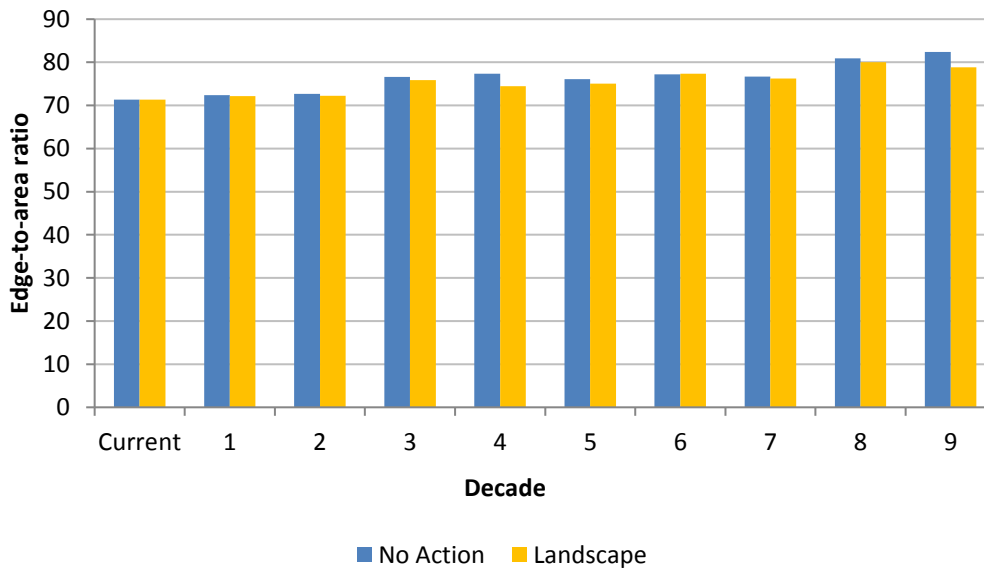


Chart K-2. Number of Acres of Interior Older Forest Patches 100 Acres and Greater on State Trust Lands in the OESF, No Action and Landscape Alternatives

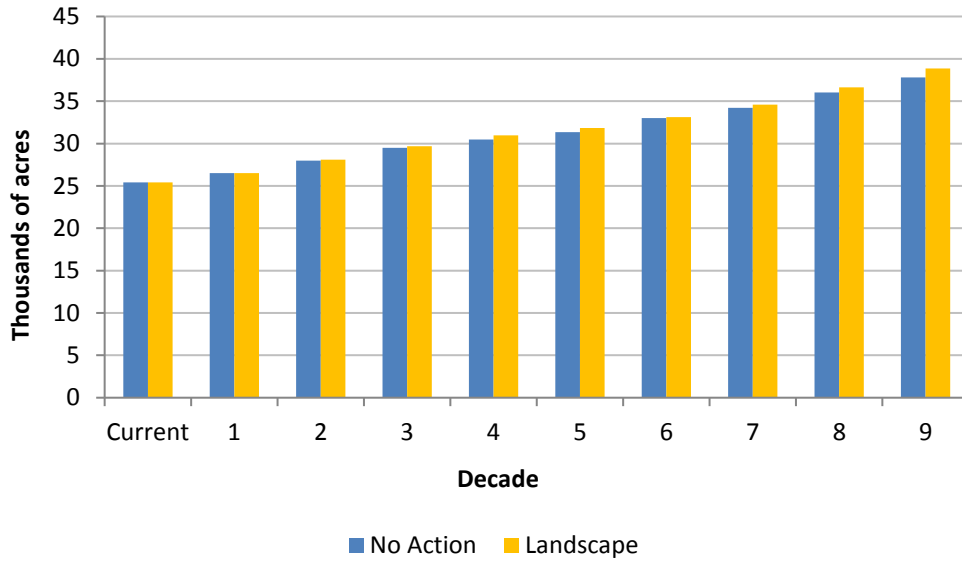
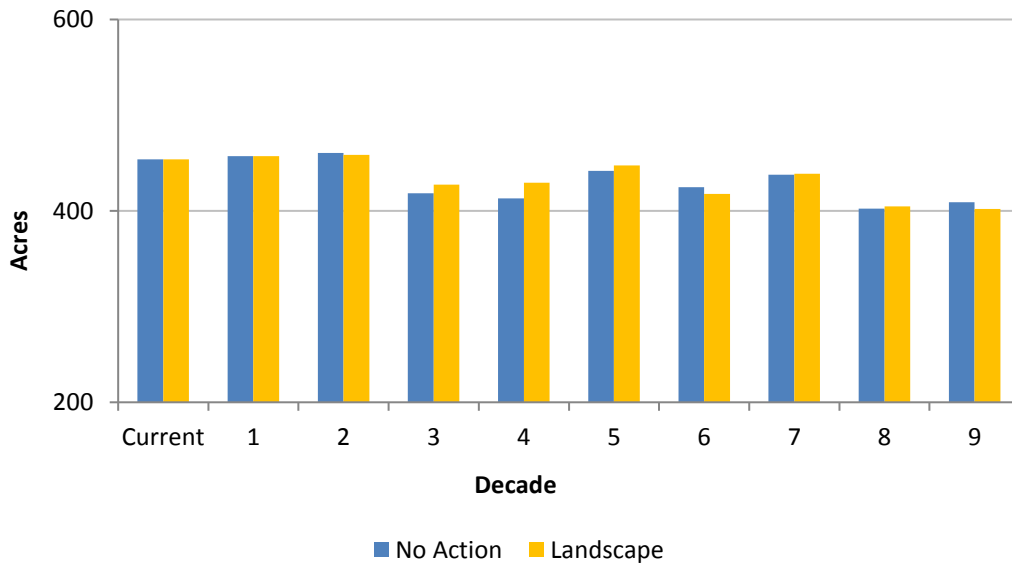


Chart K-4. Average Size (in Acres) of Interior Older Forest Patches 100 Acres and Greater on State Trust Lands in the OESF, No Action and Landscape Alternatives



Edge-to-Area Ratio Reported by Landscape

Chart K-5. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Clallam Landscape, No Action and Landscape Alternatives

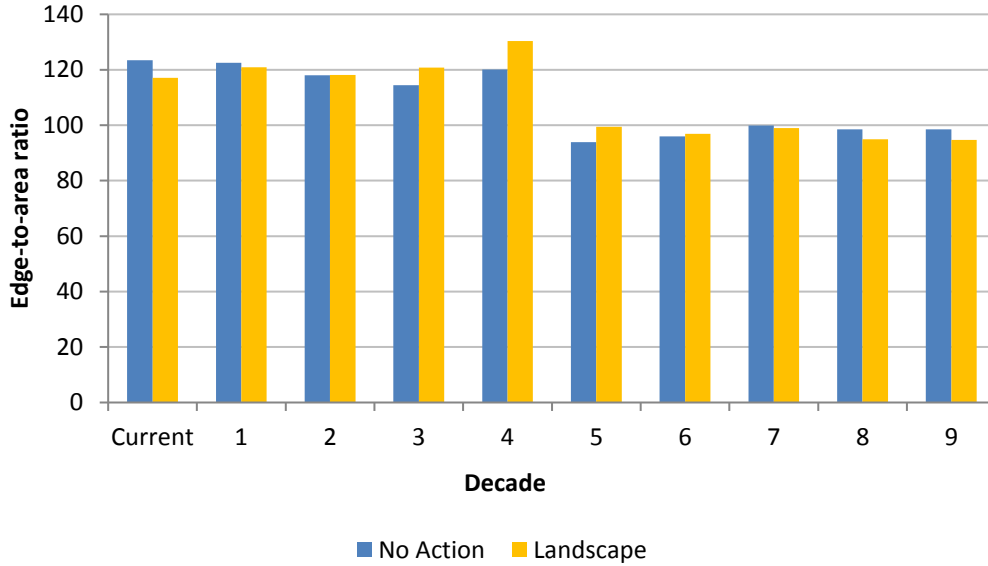


Chart K-6. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Clearwater Landscape, No Action and Landscape Alternatives

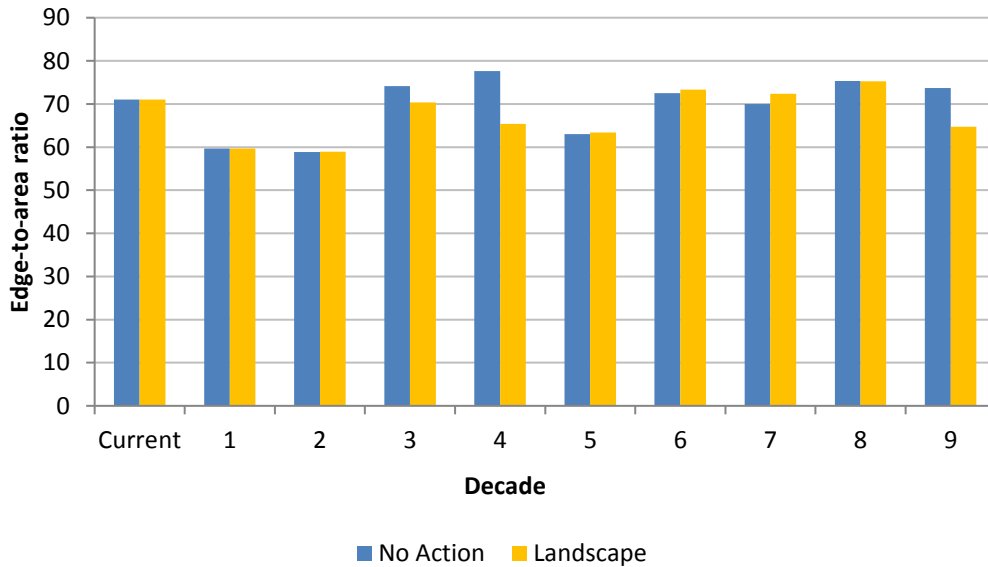


Chart K-7. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Coppermine Landscape, No Action and Landscape Alternatives

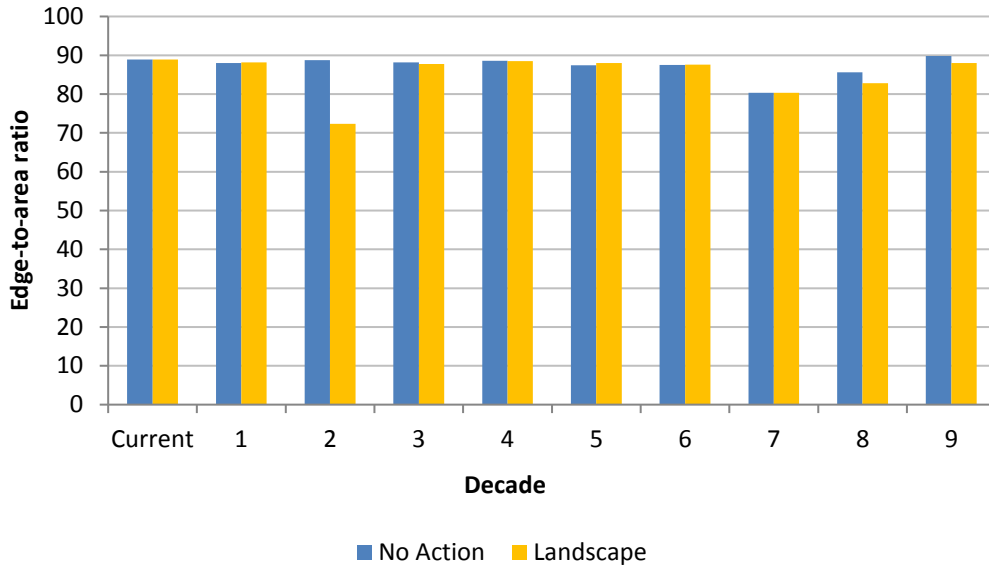


Chart K-8. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Dickodochtedar Landscape, No Action and Landscape Alternatives

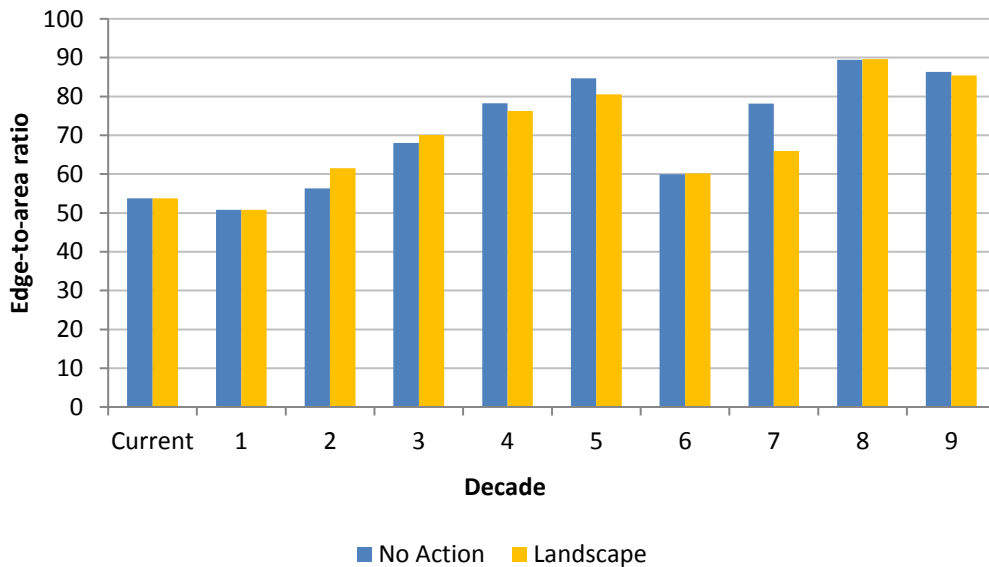


Chart K-9. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater Patches on State Trust Lands in the Goodman Landscape, No Action and Landscape Alternatives

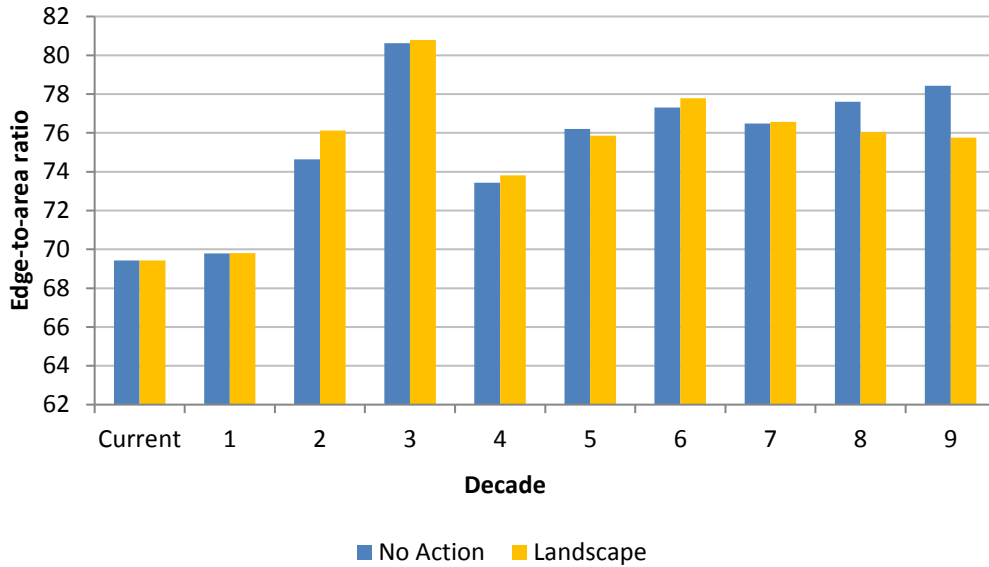


Chart K-10. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Kalaloch Landscape, No Action and Landscape Alternatives

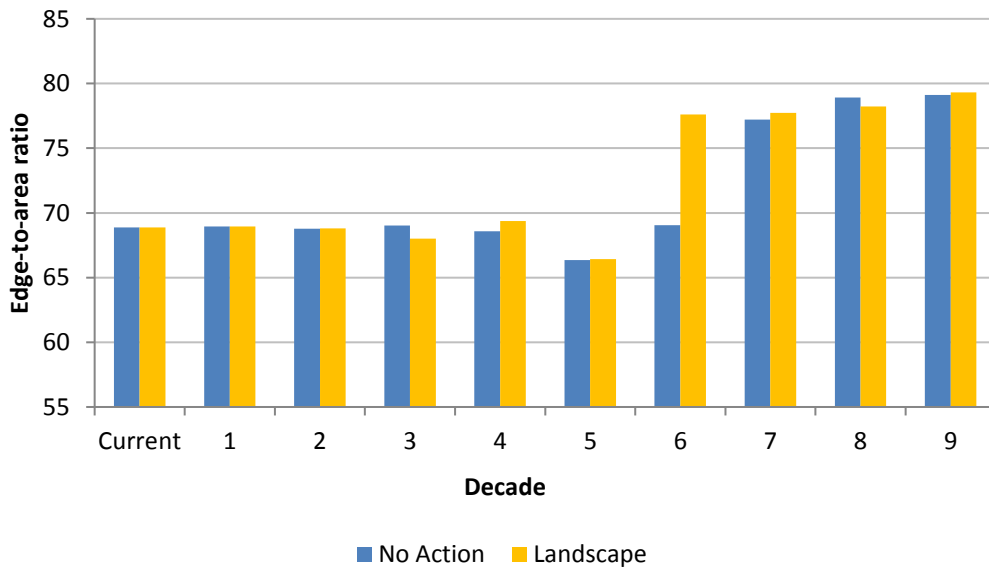


Chart K-11. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Queets Landscape, No Action and Landscape Alternatives

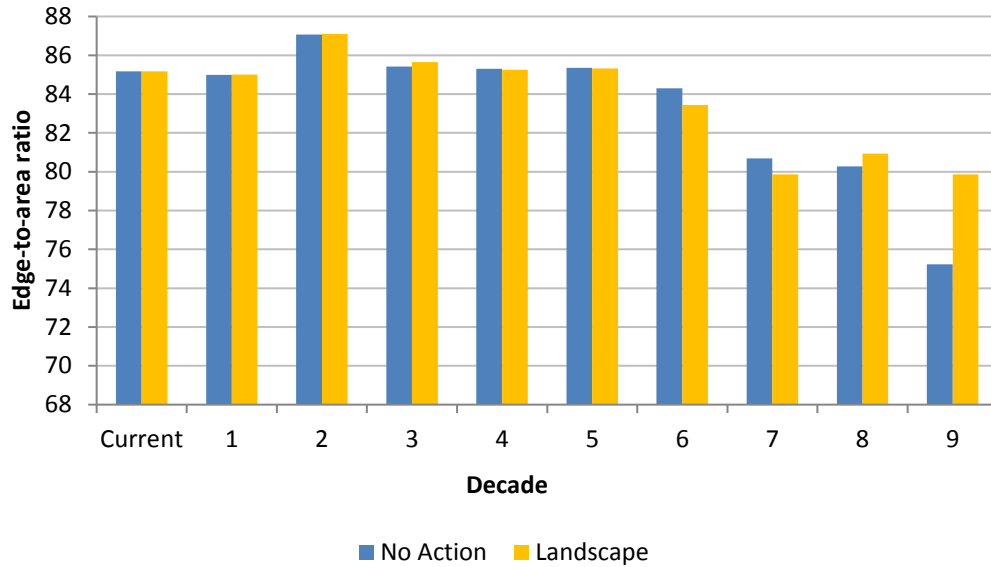


Chart K-12. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Reade Hill Landscape, No Action and Landscape Alternatives

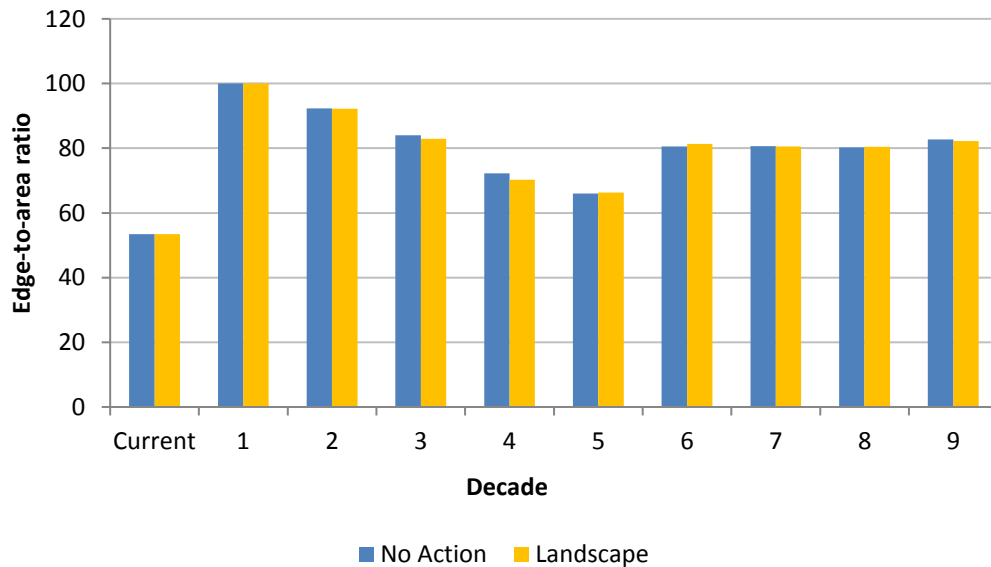


Chart K-13. Edge-to-Area Ratio Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Seiku Landscape, No Action and Landscape Alternatives

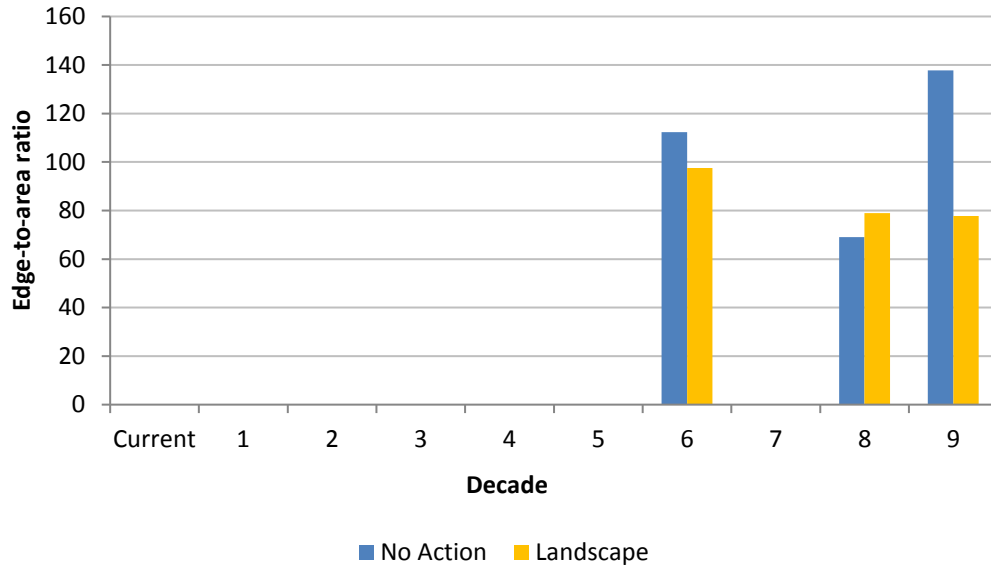


Chart K-14. Edge-to-Area Ratio Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Sol Duc Landscape, No Action and Landscape Alternatives

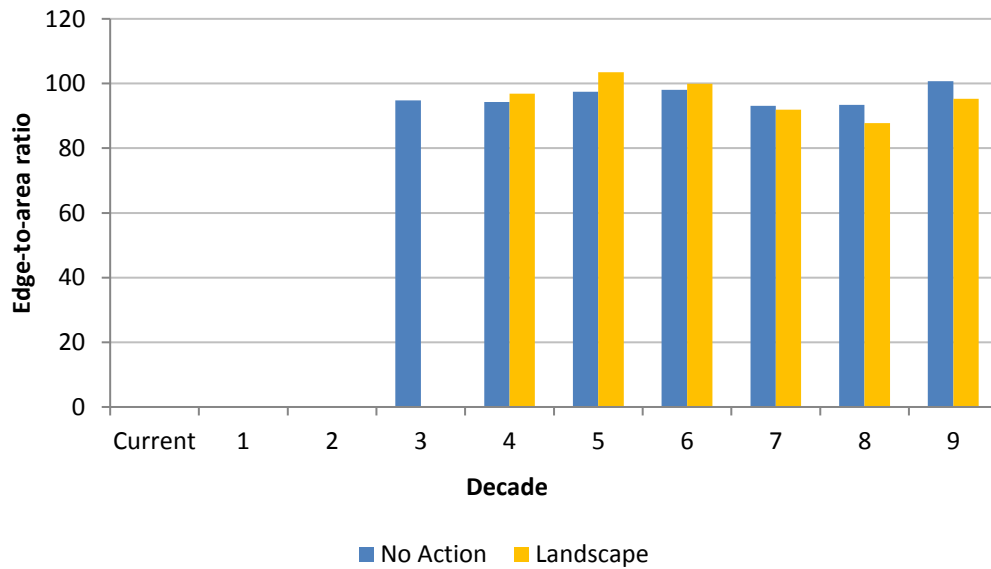
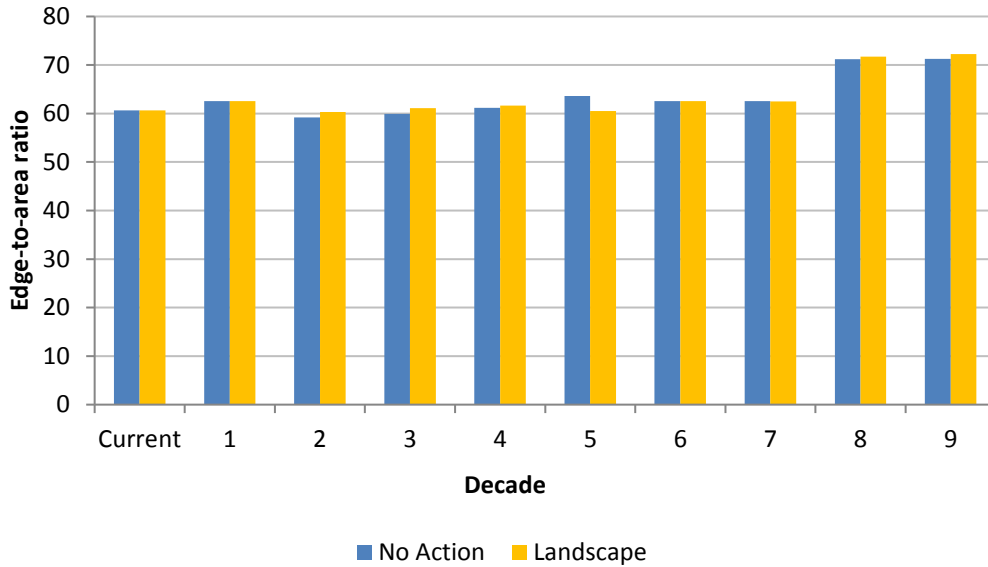


Chart K-15. Edge-to-Area Ratio for Interior Older Forest Patches 100 Acres or Greater on State Trust Lands in the Willy Huel Landscape, No Action and Landscape Alternatives



Acres of Interior Older Forest Reported by Landscape

Chart K-16. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Clallam Landscape, No Action and Landscape Alternatives

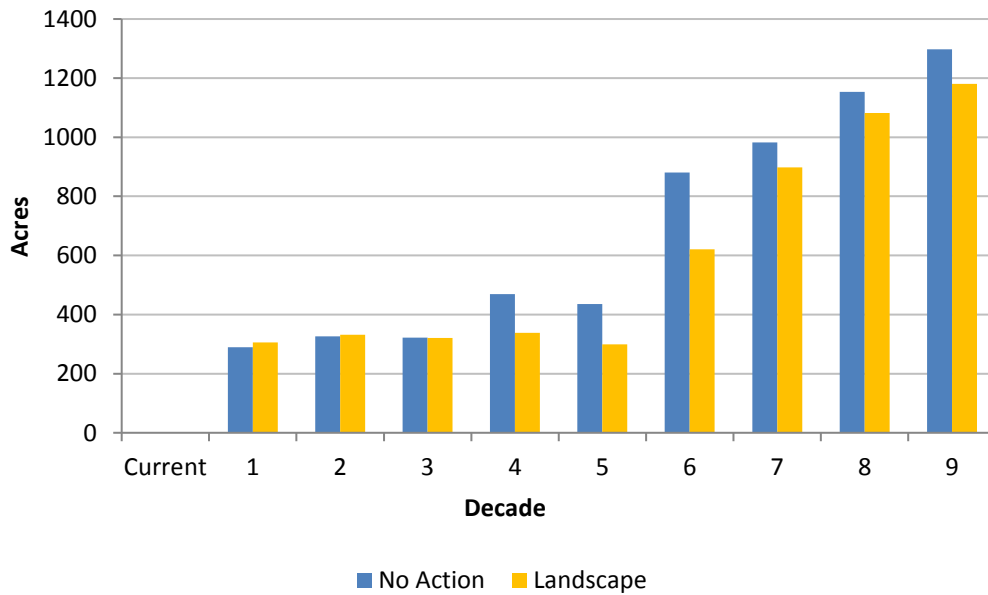


Chart K-17. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Clearwater Landscape, No Action and Landscape Alternatives

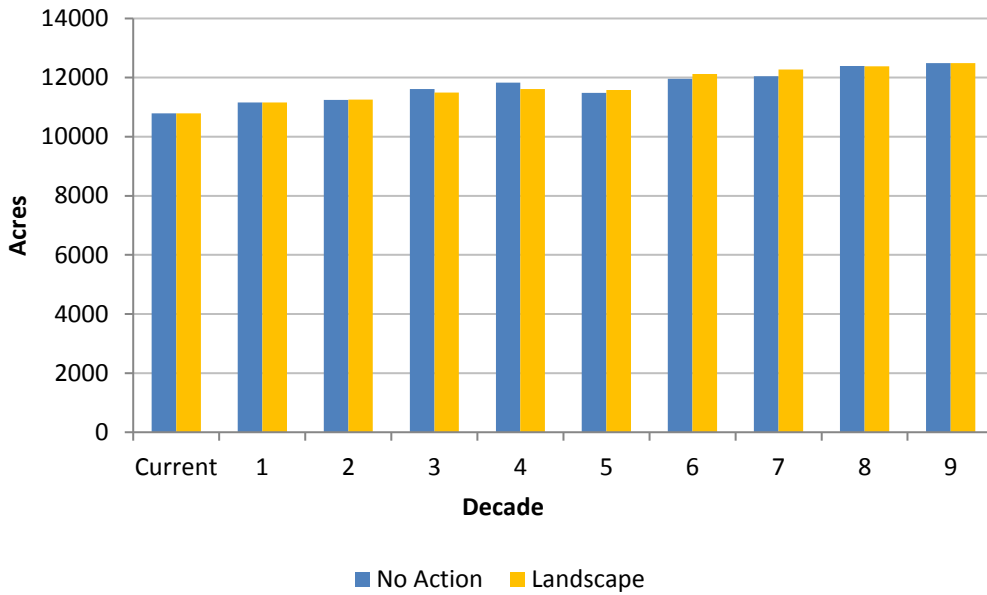


Chart K-18. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Coppermine Landscape, No Action and Landscape Alternatives

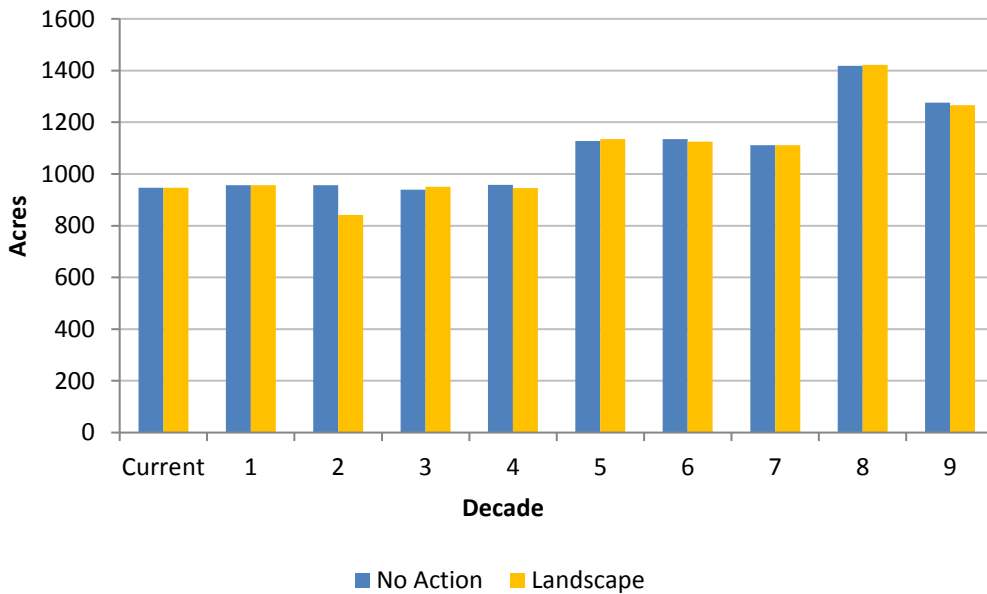


Chart K-19. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Dickodochtedar Landscape, No Action and Landscape Alternatives

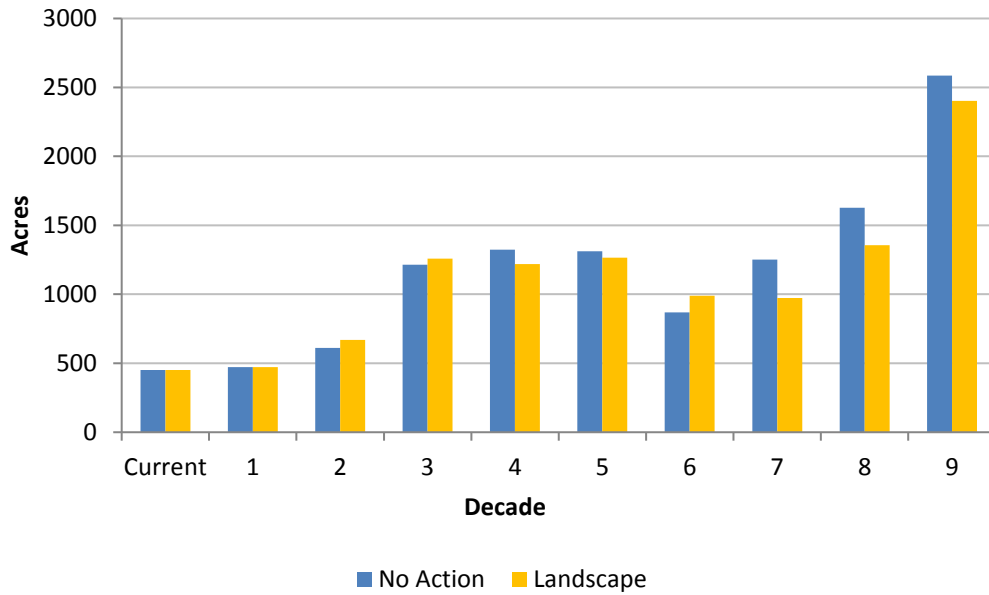


Chart K-20. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Goodman Landscape, No Action and Landscape Alternatives

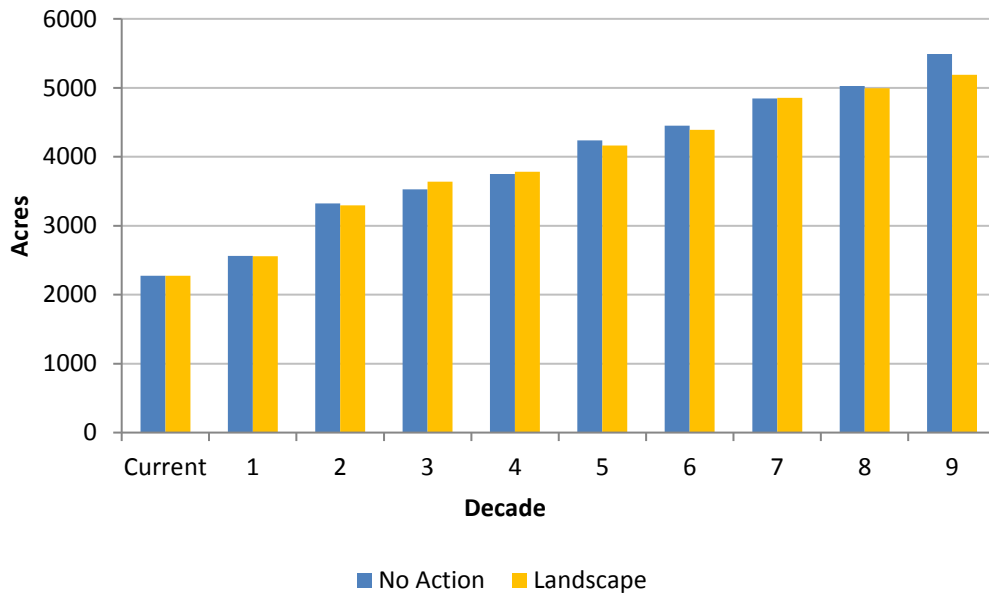


Chart K-21. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Kalaloch Landscape, No Action and Landscape Alternatives

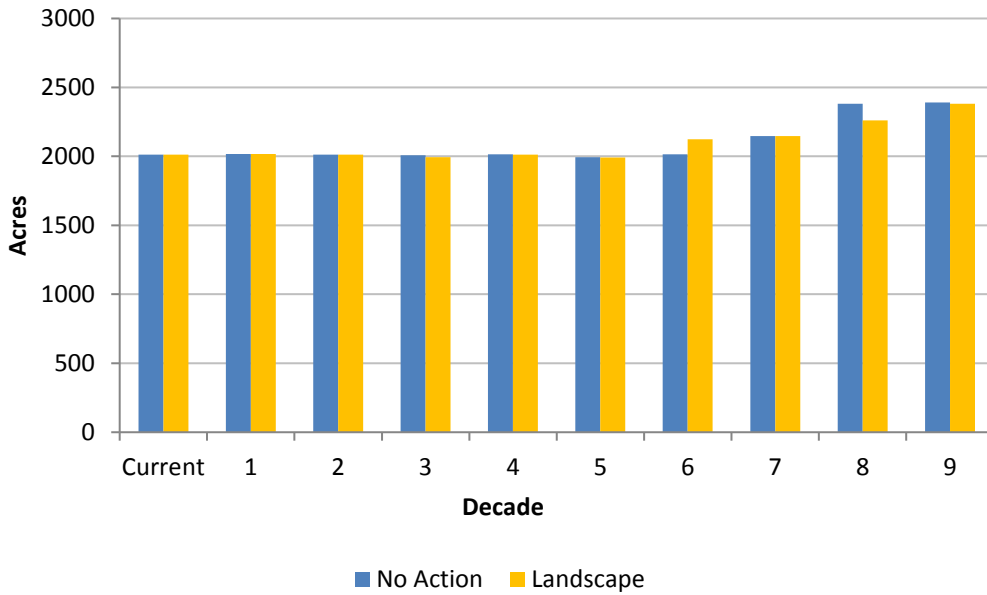


Chart K-22. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Queets Landscape, No Action and Landscape Alternatives

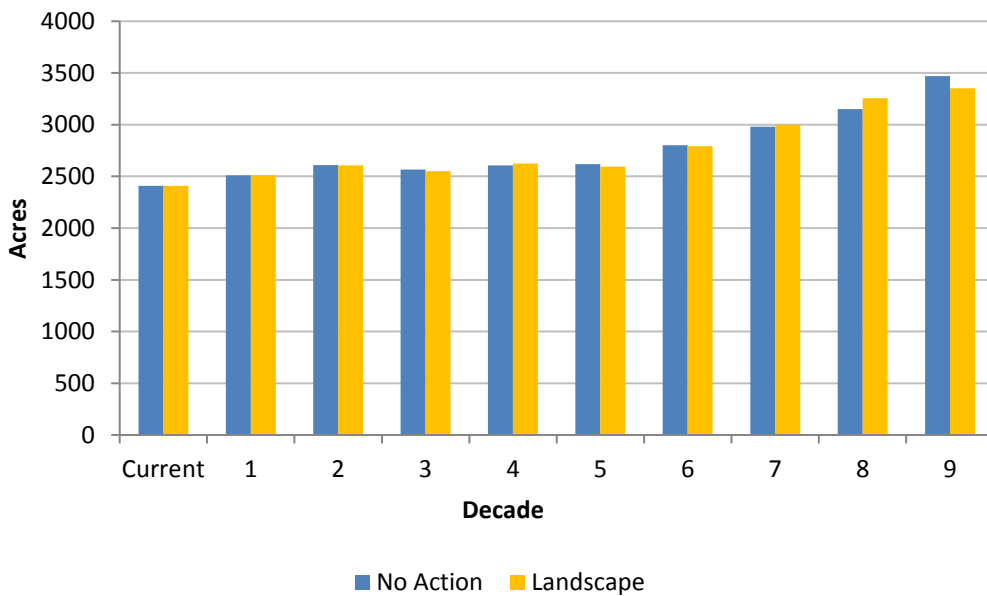


Chart K-23. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Reade Hill Landscape, No Action and Landscape Alternatives

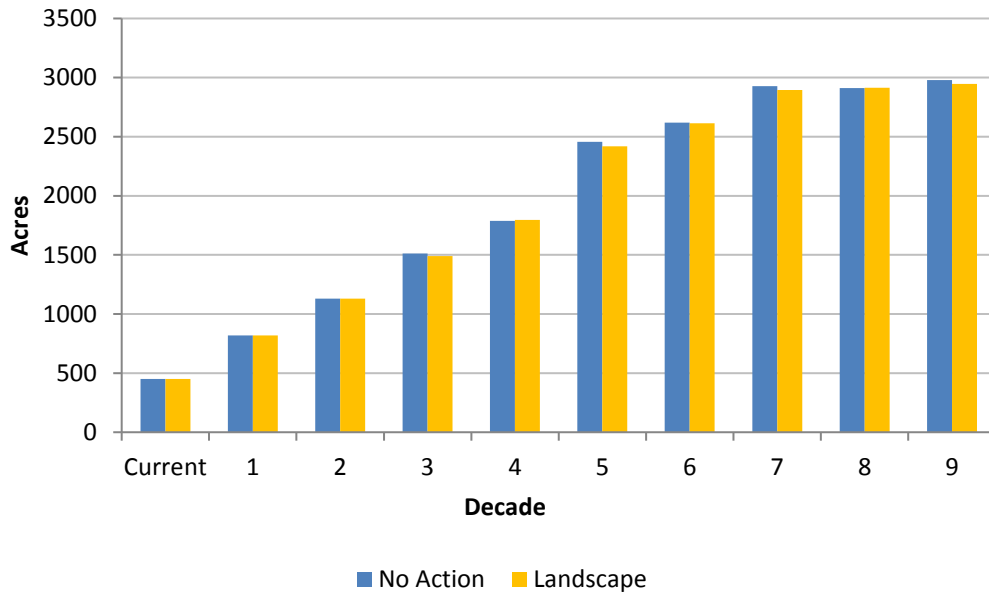


Chart K-24. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Seiku Landscape, No Action and Landscape Alternatives

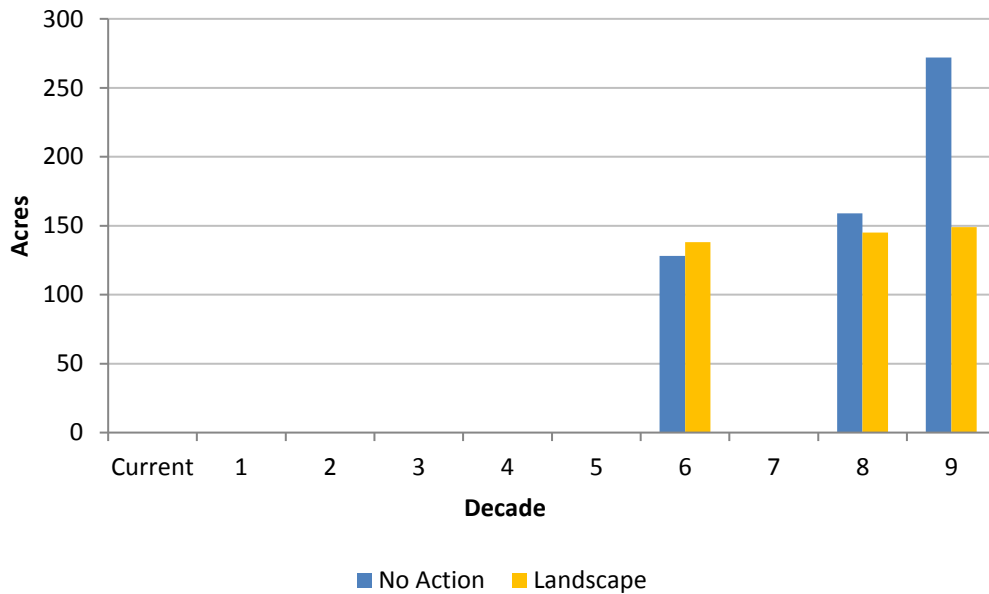


Chart K-25. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Sol Duc Landscape, No Action and Landscape Alternatives

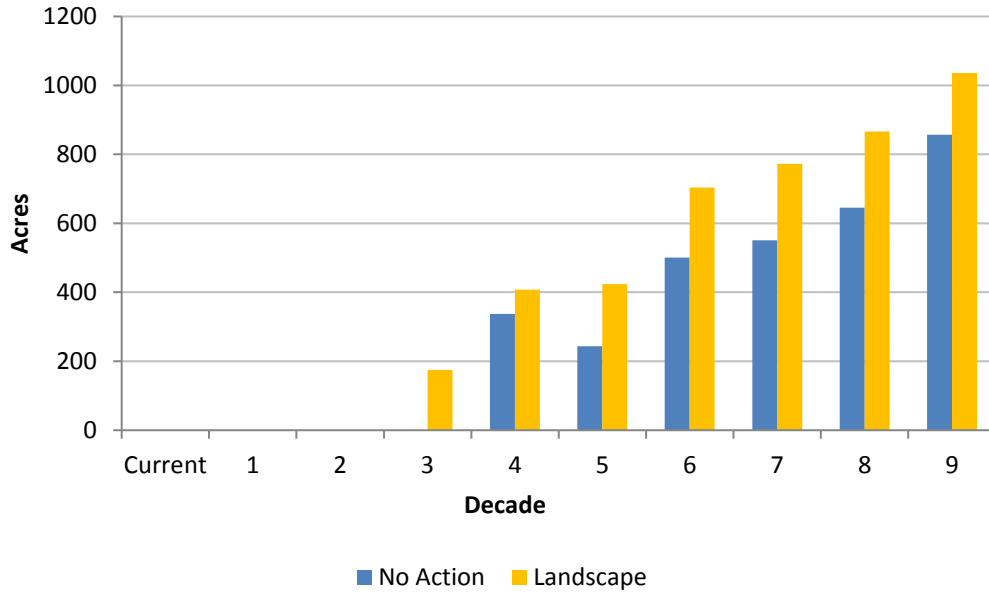
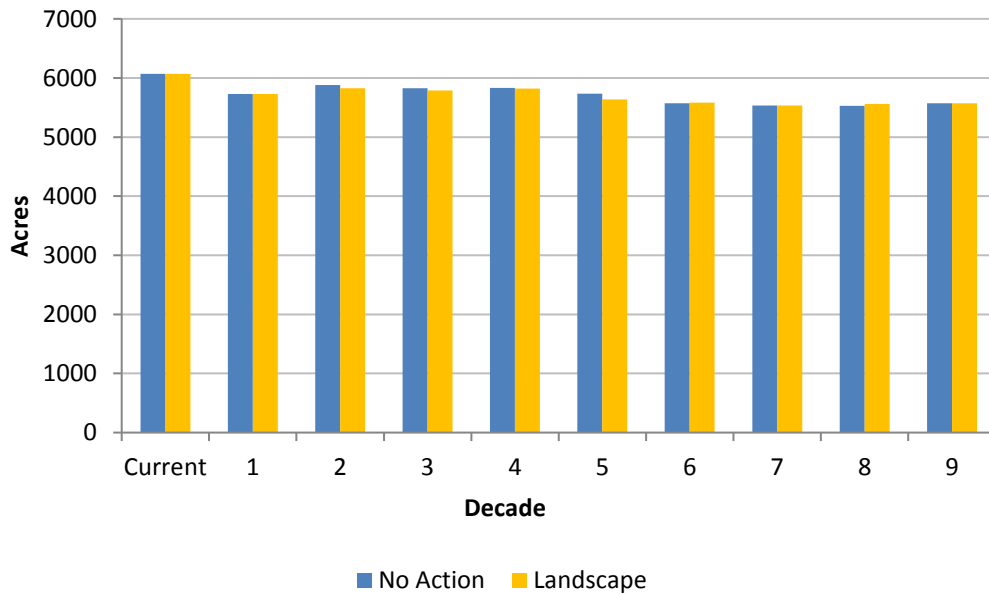


Chart K-26. Acres of Interior Older Forest in 100-Acre or Greater Patches on State Trust Lands in the Willy Huel Landscape, No Action and Landscape Alternatives



Average Patch Size (in Acres) of Interior Older Forest Reported by Landscape

Chart K-27. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Clallam Landscape, No Action and Landscape Alternatives

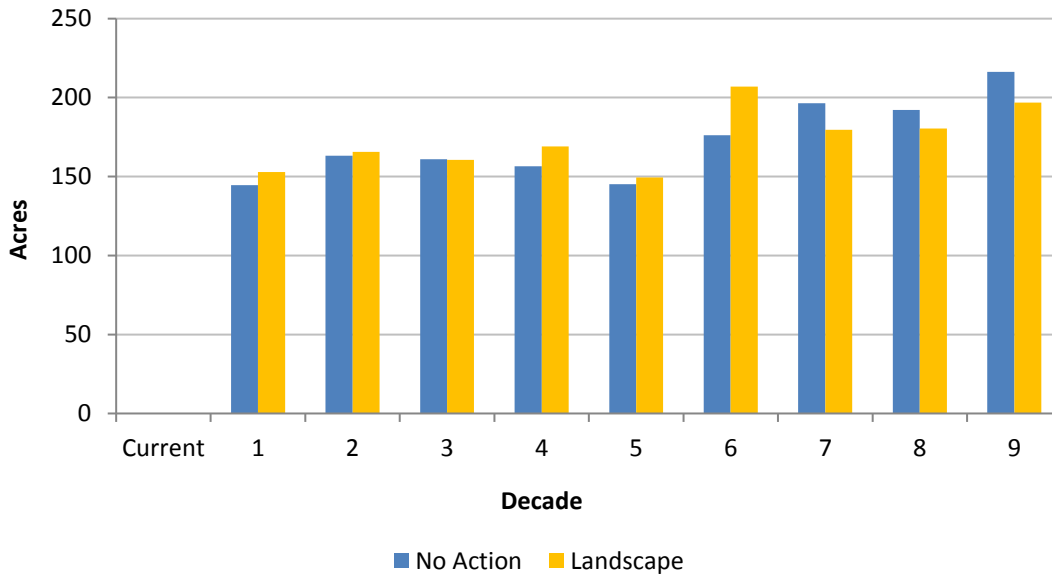


Chart K-28. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Clearwater Landscape, No Action and Landscape Alternatives

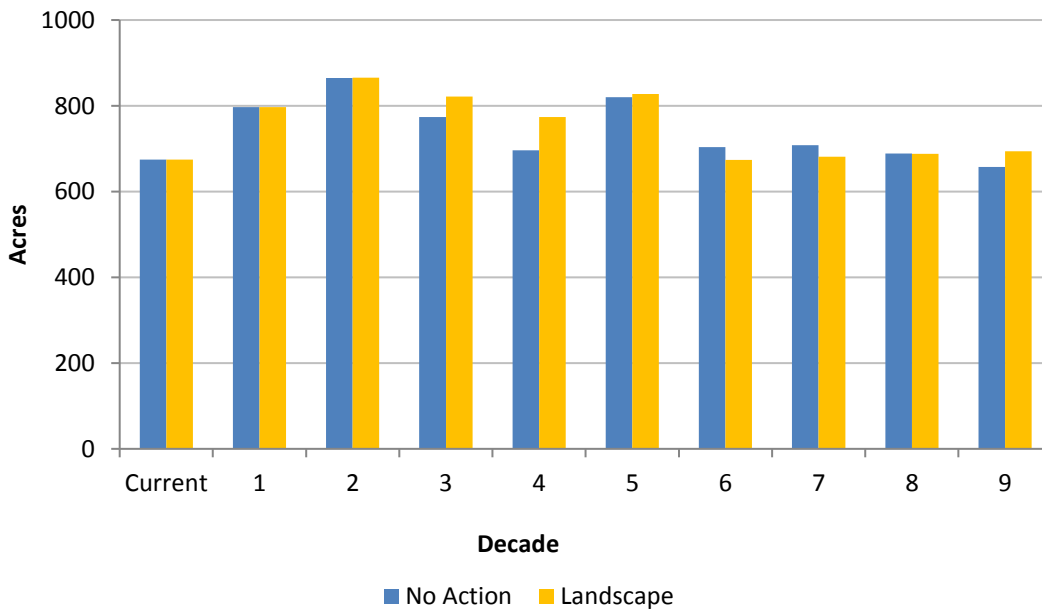


Chart K-29. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Coppermine Landscape, No Action and Landscape Alternatives

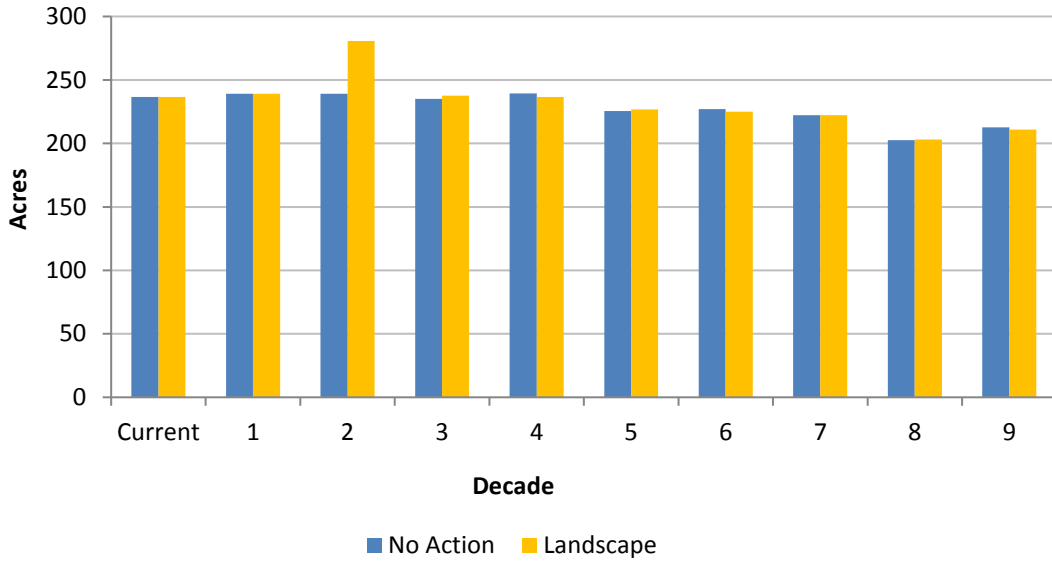


Chart K-30. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Dickodochtedar Landscape, No Action and Landscape Alternatives

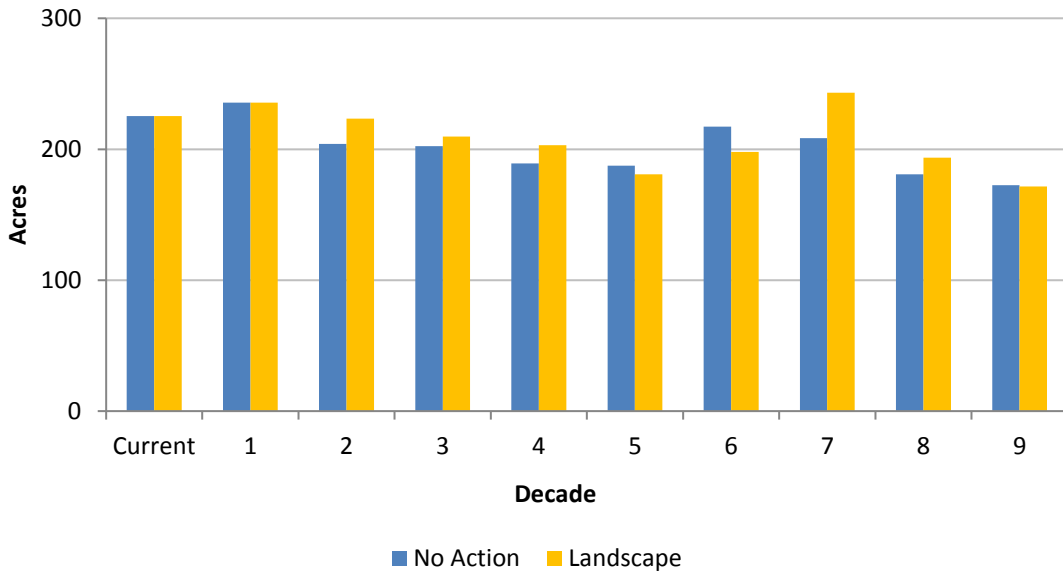


Chart K-31. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Goodman Landscape, No Action and Landscape Alternatives

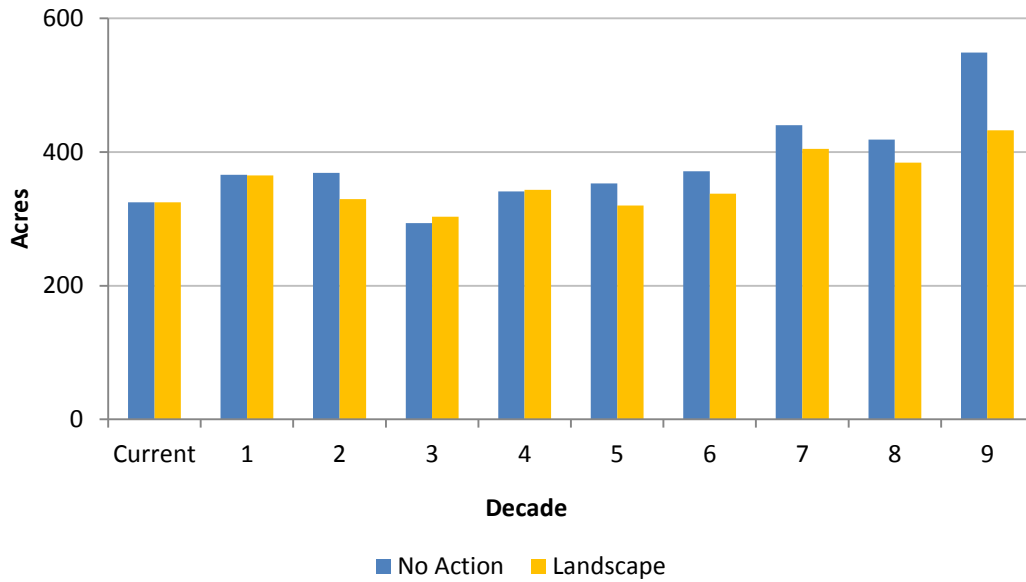


Chart K-32. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Kalaloch Landscape, No Action and Landscape Alternatives

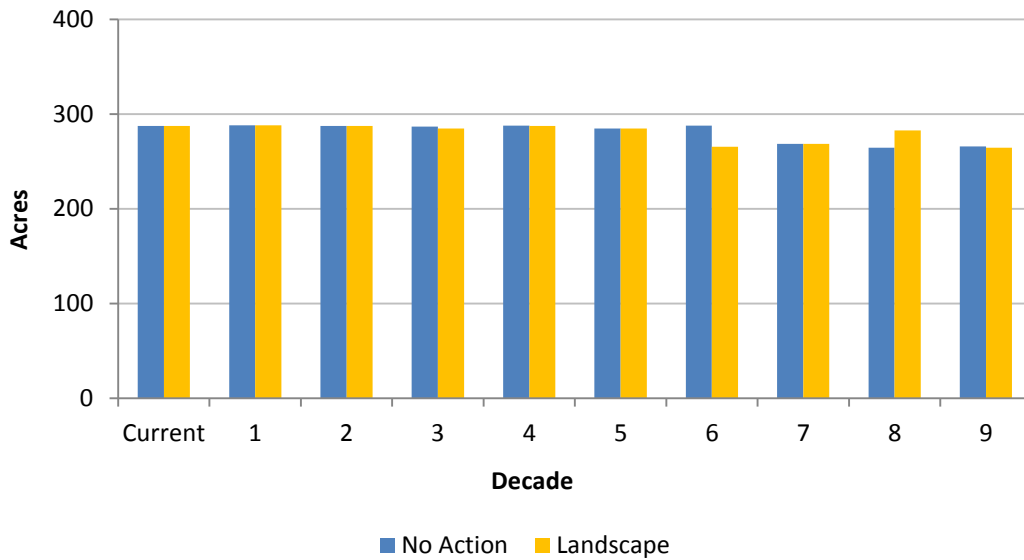


Chart K-33. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Queets Landscape, No Action and Landscape Alternatives

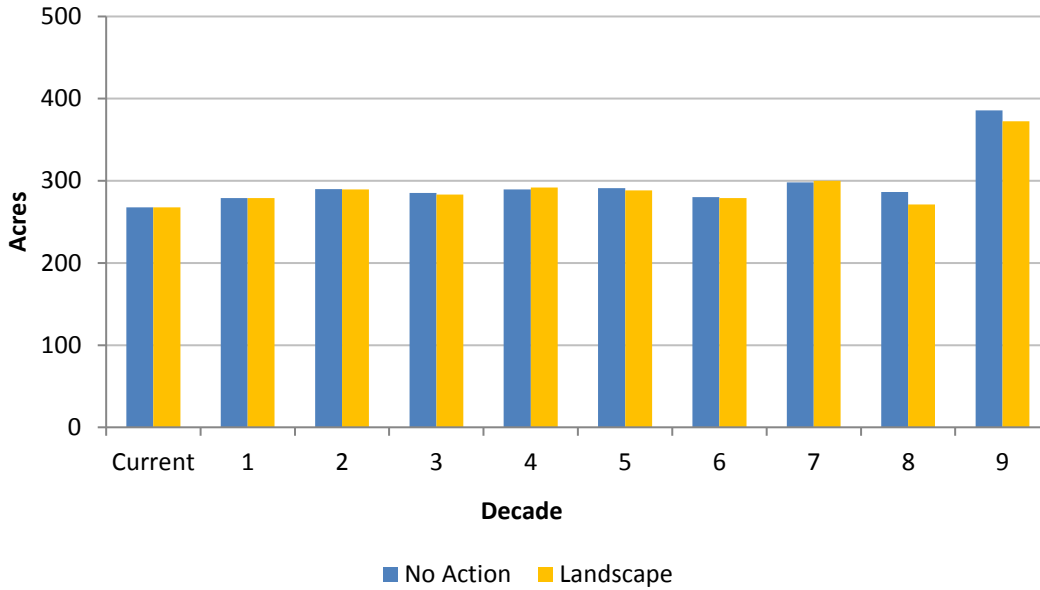


Chart K-34. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Reade Hill Landscape, No Action and Landscape Alternatives

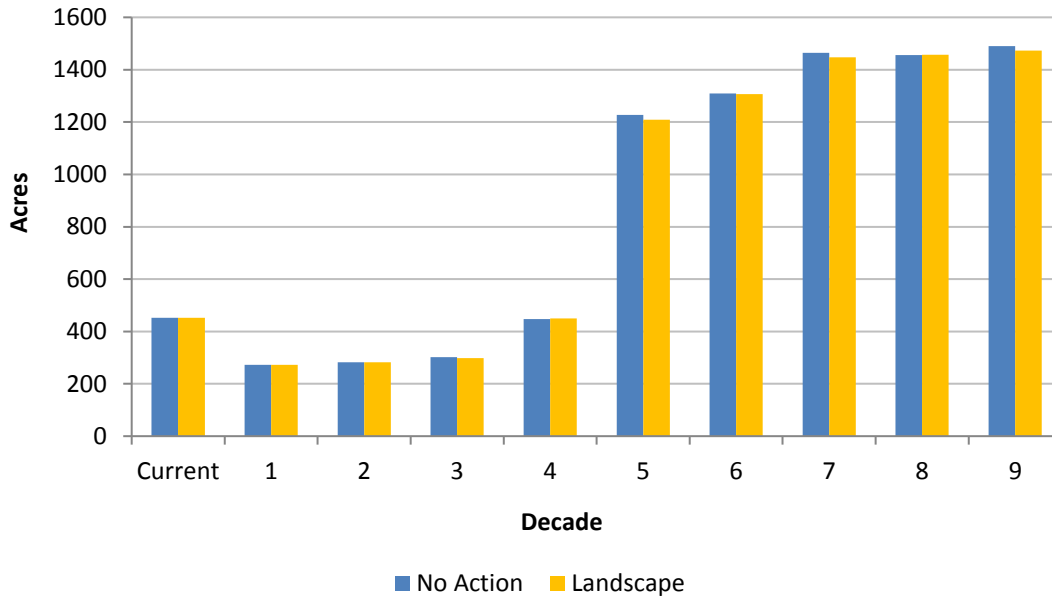


Chart K-35. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Seiku Landscape, No Action and Landscape Alternatives

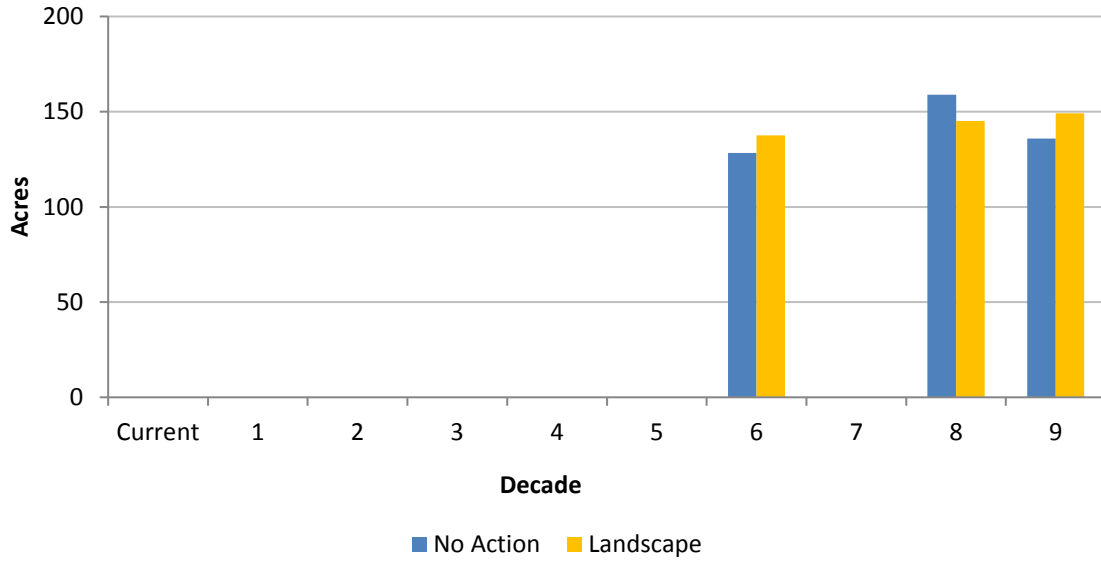


Chart K-36. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Sol Duc Landscape, No Action and Landscape Alternatives

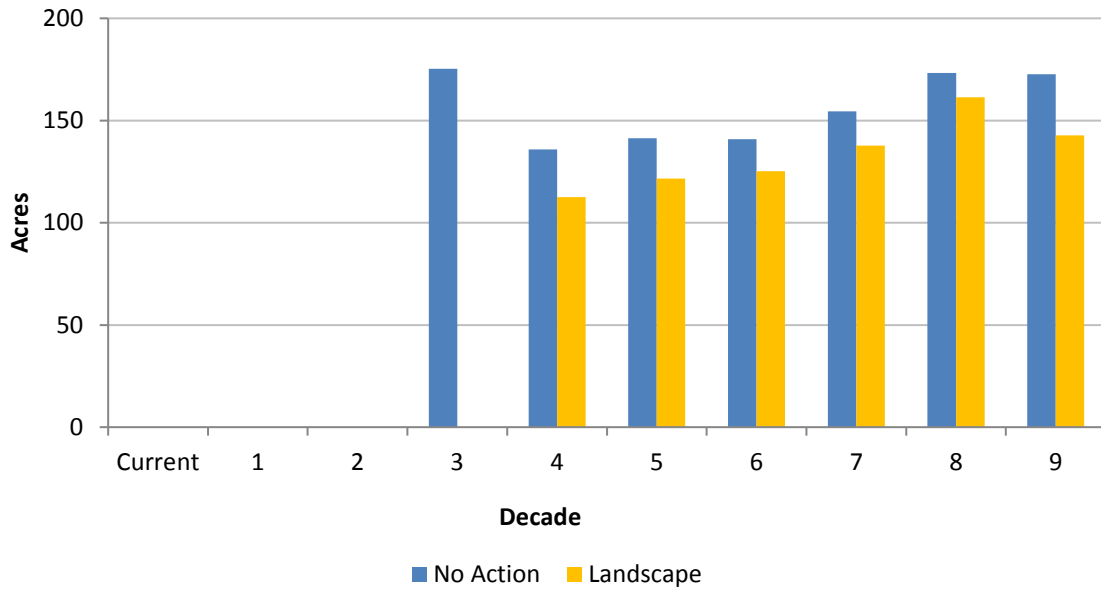
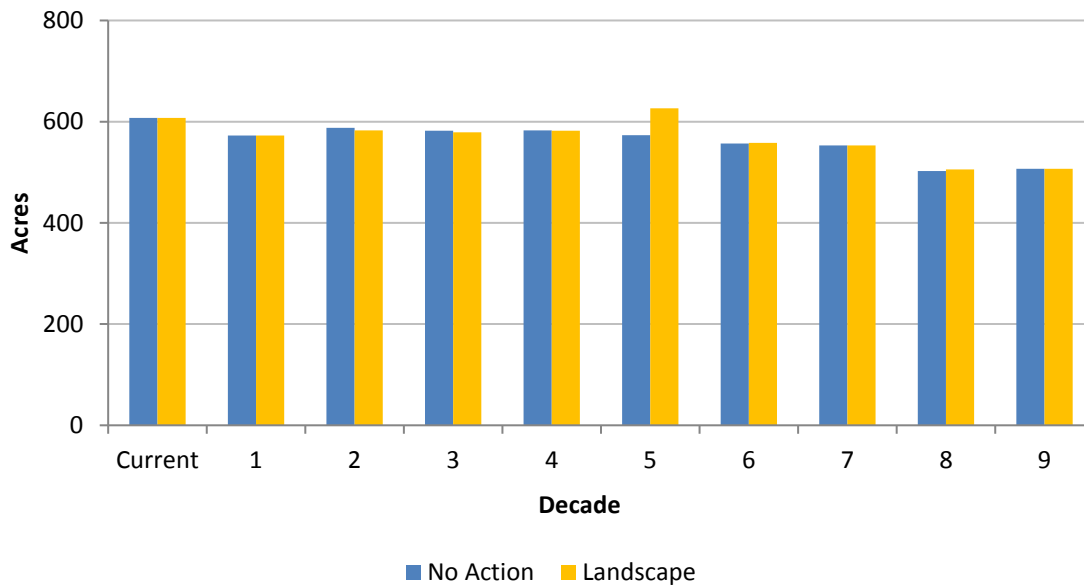


Chart K-37. Average Patch Size of Interior Older Forest (in 100-Acre or Greater Patches) on State Trust Lands in the Willy Huel Landscape, No Action and Landscape Alternatives



References

Brown, E. R., ed. 1985. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. R6-F&WL-192-1985. USDA Forest Service, Pacific Northwest Region, Portland, Oregon.

Johnson, D.H. and T.A. O'Neil (eds.). 2001. Wildlife Habitat Relationships in Oregon and Washington. Oregon State University Press, Corvallis, Oregon.